Linear Programming Problem Formulation & Inter Predation (part-2)

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& Title	**:**	**Computational Techniques for Business Economics**
Topic No.	**:**	**4**
& Title	**:**	**Linear Programming And mathematical Problem solving**
Title	**:**	**Linear Programming Problem Formulation & Inter Predation (part-2)**

Credits

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FREQUENTLY ASKED QUESTIONS

Q-1.What do you mean by feasible region?

A-1. When all of the constraints have been identified on the graph, the constraints form a closed polygon containing all of the feasible solutions to the problem. Any point inside this polygon satisfies all of the constraints. This polygon is called the *feasible region*.

Q-2.Write a detailed note on reduced cost.

A-2. Associated with each variable is a *reduced cost value*. However, the reduced cost value is only non-zero when the optimal value of a variable is zero. A somewhat intuitive way to think about the reduced cost variable is to think of it as indicating how much the cost of the activity represented by the variable must be reduced before any of that activity will be done. More precisely,

> ... The *reduced cost value* indicates how much the objective function coefficient on the corresponding variable must be improved before the value of the variable will be positive in the optimal solution.

In the case of a minimization problem, "improved" means "reduced." So, in the case of a cost-minimization problem, where the objective function coefficients represent the per-unit cost of the activities represented by the variables, the "reduced cost" coefficients indicate how much each cost coefficient would have to be reduced before the activity represented by the corresponding variable would be cost-effective. In the case of a maximization problem, "improved" means "increased." In this case, where, for example, the objective function coefficient might represent the net profit per unit of the activity, the reduced cost value indicates how much the profitability of the activity would have to increase in order for the activity to occur in the optimal solution. The units of the reduced cost values are the same as the units of the corresponding objective function coefficients.

If the optimal value of a variable is positive (not zero), then the reduced cost is always zero.
If the optimal value of a variable is zero and the reduced cost corresponding to the variable is also zero, then there is at least one other corner that is also in the optimal solution. The value of this variable will be positive at one of the other optimal corners.

Q-3. Explain the shadow price in the solution generated through computer

A-3. Shadow price is also called dual price. The dual price is only positive when a constraint is binding.The *dual price* gives the improvement in the objective function if the constraint is relaxed by one unit.A dual price is reported for each constraint.

Q-4. Explain the interpretation of shadow price in the solution generated through computer.

A-4. In the case of a less-than-or-equal constraint, such as a resource constraint, the dual price gives the value of having one more unit of the resource represented by that constraint. In the case of a greater-than-or-equal constraint, such as a minimum production level constraint, the dual price gives the cost of meeting the last unit of the minimum production target.The units of the dual prices are the units of the objective function divided by the units of the constraint.

Q-5. What are the three key points that you should have learned from the graphical solutions?

A-5. Three key points that you should have learned from the graphical solutions are:

1) The constraints should define a polygon called the feasible region;
2) The objective function defines a set of parallel lines one for each potential value of the objective function; and
3) The solution is the last corner or face of the feasible region that the objective function touches as the value of the objective function is improved.